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A new species and new records of *Endophragmiella* from China

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Abstract— Four *Endophragmiella* species are described and illustrated: *E. nanlingensis* occurring on dead branches of *Melicope triphylla* is proposed as new, and *E. pulchra, E. rostrata,* and *E. resinae* found on dead branches of unidentified plants are recorded for the first time from China. The specimens are deposited in Herbarium of Shandong Agricultural University, Plant Pathology (HSAUP) and Mycological Herbarium, Institute of Microbiology, Chinese Academy of Sciences (HMAS).

Key words—anamorphic fungi, hyphomycete, taxonomy

Sutton (1973) proposed the genus *Endophragmiella* to accommodate two species, *E. pallescens* B. Sutton and *E. canadensis* (Ellis & Everh.) B. Sutton. Subsequently, Hughes (1979) emended the genus and gave a very detailed account of conidiogenesis and generic concepts. *Endophragmiella* is characterized by macronematous, mononematous conidiophores with integrated, percurrently proliferating conidiogenous cells and acrogenous, solitary, septate conidia with rhexolytic secession. Presently, more than 80 species are accepted in *Endophragmiella*, most of which are reported from rotten wood, dead branches, and decaying leaves of various plants; a few species have associations with other fungi (Sutton 1973, Hughes 1979).

During a continuing survey of saprobic fungi in tropical forests of Guangdong Province, China, four *Endophragmiella* species were found on dead branches. *Endophragmiella nanlingensis* is proposed herein as new, based on its distinctive conidial characters, and *E. pulchra, E. rostrata* and *E. resinae* are recorded from China for the first time.

Endophragmiella nanlingensis S.C. Ren & X.G. Zhang, **sp. nov.** Fig. 1

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Coloniae in substrato naturali effusae, pilosae, fuscae ad usque atrae. Mycelium immersum, sparsum, ex hyphis septatis, laevibus, pallide brunneis, ramosis, 2–4 µm latis

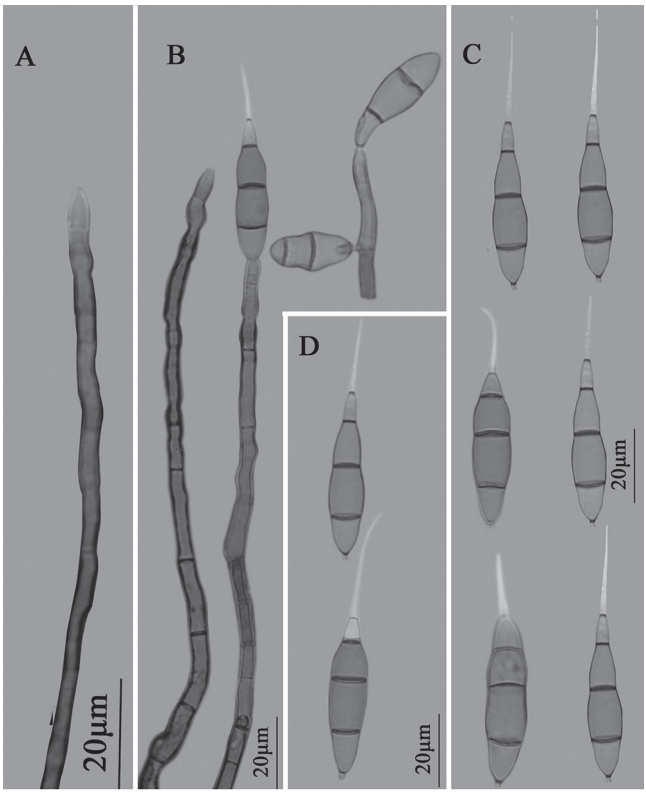

Fig. 1. *Endophragmiella nanlingensis*. A. Conidiophore and conidiogenous cell. B. Conidiophores, conidiogenous cells and conidia. C–D. Conidia.

compositum. Conidiophora *macronematosa, mononematosa, singularia vel fasciculata, simplicia, erecta, recta vel leviter flexuosa, laevia, septata, brunnea, apicem versus pallidiora, 80–160 µm alta, 4.5–9 µm lata, interdum ad basim inflata, 1–5 proliferationes percurrentes elongantia.* Cellulae conidiogenae *monoblasticae, integratae, terminales, percurrentes, cylindricae, ad apicem contractae et truncatae.* Conidia *acrogena, solitaria, late fusiformia, rostrata, (3–)4(–5)-euseptata, ad septa interdum leviter constricta, cum cellula centrali brunnea, cellula basali et apicali pallide brunnea, laevia, 55–80 µm longa, 10–13 µm lata, cum rostro 23–33 µm longo, ad basim 1.5–2 µm, ad fundamentum distincta fractam ob partem cellulae conidiogenae superiorem fimbriata.*

Holotype: **CHINA. Gungdong Province**: tropical forest of Nanling, on dead branches of *Melicope triphylla* (Lam.) Merr. (*Rutaceae*), 10 Dec. 2010, Sh.C. Ren, HSAUP H8334 (isotype HMAS 146104).

Etymology: named for the collection locality.

Colonies on natural substratum effuse, hairy, dark blackish brown to black. Mycelium immersed, sparse, composed of septate, smooth, pale

brown, branched hyphae 2–4 μm wide. Conidiophores macronematous, mononematous, arising singly or sometimes fasciculate, simple, erect, straight or slightly flexuous, smooth, septate, brown, paler towards the apex, 80–160 μm high, 4.5–9 μm wide, sometimes swollen at the base, with 1–5 percurrent proliferations. Conidiogenous cells monoblastic, integrated, terminal, percurrent, cylindrical, tapered to a truncate apex. Conidia acrogenous, solitary, broadly fusiform, rostrate, (3–)4(–5)-euseptate, slightly constricted at the septa, central cells brown, basal cells and apical cells pale brown, smooth, 55–80 μm long, 10–13 μm wide, rostrum 23–33 μm long, base truncate, 1.5–2 μm wide, with a distinct basal frill of 2.5–3.5 μm long, derived from the apex of the conidiogenous cell.

Notes: *Endophragmiella nanlingensis* is closely related to *E. fusiformis* W.P. Wu (Wu & Zhuang 2005) in its proliferating conidiophores producing fusiform, rostrate, multiseptate conidia, except that *E. fusiformis* produces conidia that are narrower (7.5–9 μm) and have more (6–7) septa. In addition, the conidia of *E. nanlingensis* slightly constricted at the septa, while those in *E. fusiformis* are not.

Endophragmiella rostrata (Kirk 1985) and *E. variabilis* R.F. Castañeda (Castañeda Ruíz 1988) are also morphologically similar to *E. nanlingensis*. However, *E. rostrata* conidia are obclavate, smaller (13–24 × 4–5 μm), and have fewer (3) septa, while *E. variabilis* produces obclavate or Y-shaped, smaller conidia (15–23 × 4–5 μm, ramuli 9–10 × 3 μm) with fewer septa (2–4-septate).

Endophragmiella pulchra (B. Sutton & Hodges) P.M. Kirk. Trans. Br. Mycol. Soc. 78: 298 (1982) Fig. 2

Anamorphic fungi. Colonies effuse, blackish brown to black, hairy. Mycelium immersed in the substratum, composed of branched, septate, pale brown hyphae. Conidiophores macronematous, mononematous, arising singly or in a group, erect, straight or slightly flexuous, sometimes swollen at the base, smooth, brown, paler towards the apex, septate, 120–400 μm long, 4–7 μm wide, with up to 3 or more percurrent proliferations at the apex. Conidiogenous cells monoblastic, integrated, terminal, percurrent, cylindrical. Conidia holoblastic, terminal, solitary, dry, smooth, ellipsoid, rostrate, 3-septate, sometimes slightly constricted at the septa, median cells brown, basal and apical cell pale brown, conidia 35–40 μm long (including rostrum), 5.5–6.5 μm wide, rostrum 8–11 μm long, with a small basal frill derived from the apex of the conidiogenous cell.

Specimens examined: **China. Gungdong Province**: tropical forest of Nanling, on dead branches of unidentified plant, 10 Dec 2010, Sh.C. Ren, HSAUP H8423; **Fujian Province**: forest park of Wuyishan, on dead branches of unidentified plant, 8 Aug. 2010, Y.D. Zhang, HSAUP H3101 (duplicate HMAS 146105).

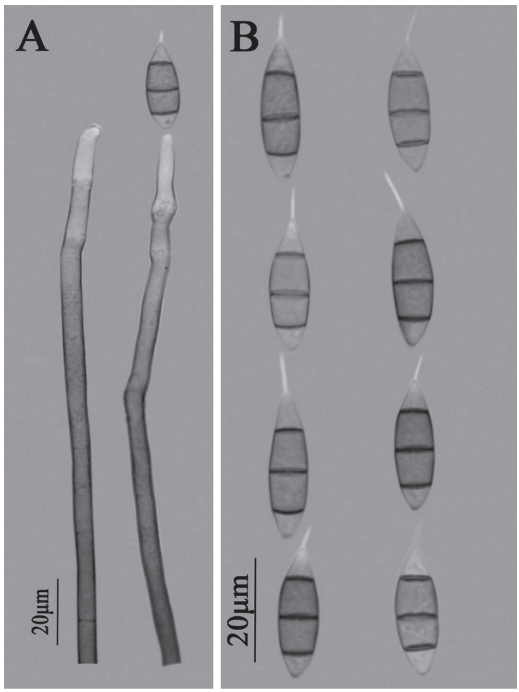

Fig. 2. *Endophragmiella pulchra.*
A. Conidiophores, conidiogenous cells and conidium. B. Conidia.

Notes: *Endophragmiella pulchra* was originally described by Sutton & Hodges (1978) as *Chaetendophragmiopsis pulchra*. Kirk (1982) subsequently transferred it to *Endophragmiella* based on its percurrently proliferating conidiogenous cells and rhexolytically seceding conidia. The conidial features in our specimen agreed well with those reported by Kirk. The species differs from others *Endophragmiella* species by its ellipsoid, 3–4-septate conidia with a filiform rostrum.

Endophragmiella rostrata P.M. Kirk, Mycotaxon 23: 325 (1985) Fig. 3

Anamorphic fungi. Colonies effuse, blackish brown to black, hairy. Mycelium mostly immersed in the substratum, composed of branched, septate, pale brown to brown, smooth-walled hyphae, 1.5–3 μm wide. Conidiophores macronematous, mononematous, arising singly or in group, erect, straight or slightly flexuous, sometimes swollen at the base, smooth, brown, paler towards the apex, septate, 120–180 μm long, 3–4 μm wide, with up to 4 or more percurrent proliferations at the apex. Conidiogenous cells monoblastic,

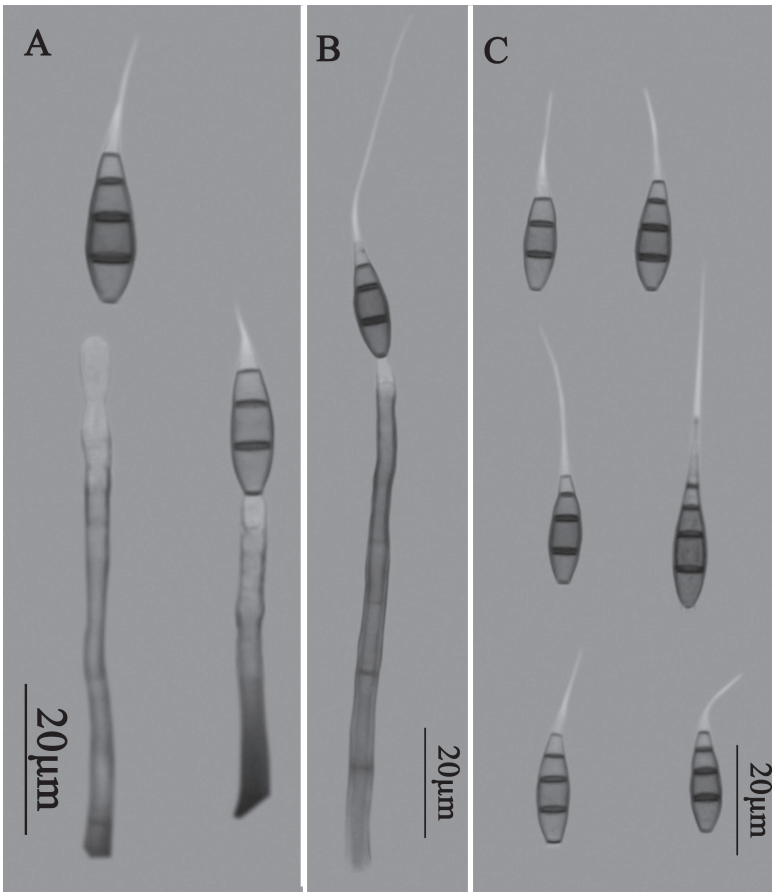

Fig. 3. *Endophragmiella rostrata*.
A–B. Conidiophores, conidiogenous cells and conidia. C. Conidia.

integrated, terminal, percurrent, cylindrical. Conidia holoblastic, terminal, solitary, dry, smooth, obclavate, rostrate, (3–)4-septate, sometimes slightly constricted at the septa, pale brown to brown, body of conidium 20–30 μm long, 4–5 μm wide, rostrum 25–40 μm long, with a small basal frill derived from the apex of the conidiogenous cell.

Specimen examined: **CHINA. Gungdong Province**: tropical forest of Nanling, on dead branches of unidentified plant, 10 Dec 2010, Sh.C. Ren, HSAUP H8226 (duplicate HMAS 146106).

Notes: Compared with the type specimen described by Kirk (1985), the conidia of our collection are slightly shorter and have more septa than those of type

material (40–85 μm long, 2–3-septate). Despite these minor differences, we believe they represent the same species. *Endophragmiella rostrata* bears some affinities with *E. corticola* P.M. Kirk (Kirk 1982) in conidial morphology, but *E. corticola* can be separated from the former by its narrowly obclavate to broadly fusiform conidia with more variable septation (1–3(–4)-septate), more variable conidial dimensions (1-septate conidia 14–23 × 5–6 μm, 2-septate conidia 18–38 × 5.5–6(–6.5) μm, 3-septate conidia 25–42 × 5.5–6.5 μm), and shorter apical cell measuring 8–12 μm long.

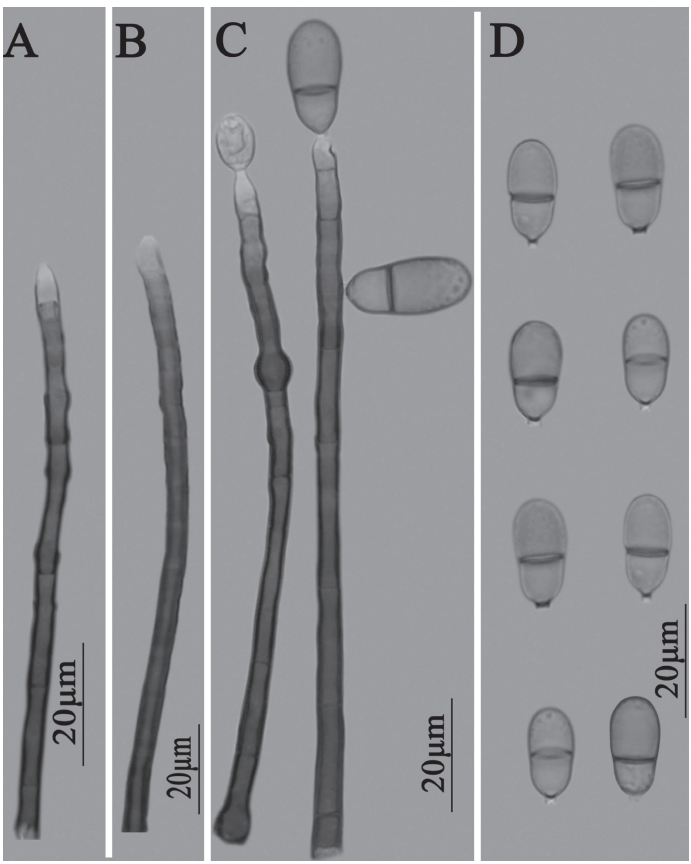

Fig. 4. *Endophragmiella resinae.*
A–B. Conidiophores. C. Conidiophores, conidiogenous cells and conidia. D. Conidia.

Endophragmiella resinae P.M. Kirk. Trans. Br. Mycol. Soc. 76: 78 (1981) Fig. 4

Colonies effuse, hairy, dark blackish brown to black, inconspicuous. Mycelium immersed in the substratum, composed of septate, smooth, pale

brown, branched hyphae 2–4 µm wide. Conidiophores macronematous, mononematous, arising singly, unbranched, erect, straight or flexuous, septate, smooth, dark brown, paler towards the apex, percurrently regenerating, 145–210 µm long, 3.5–4.5 µm wide, 7–10 µm wide at the base, with 1–6 percurrent proliferations. Conidiogenous cells monoblastic, integrated, terminal, percurrent, cylindrical, tapered to a truncate apex. Conidia holoblastic, terminal, solitary, dry, smooth, obovoid to pyriform, thick-walled, 1-septate, the upper cell longer than the basal one, basal cell pale brown, apical cell brown, 15–19 µm long, 8–9 µm wide, with a distinct basal frill of 0.5–1µm long, derived from the distal end of the conidiogenous cell.

Specimen examined: **CHINA. Gungdong Province**: tropical forest of Nanling, on dead branches of unidentified plant, 10 Dec 2010, Sh.C. Ren, HSAUP H8346 (duplicate HMAS 146107).

Notes: *Endophragmiella resinae* is similar to a group of species with obpyriform to subglobose and 1-septate conidia, such as *E. angustispora* S. Hughes, *E. bukkensis* Révay, *E. boewei* (J.L. Crane) S. Hughes, *E. bogoriensis* Rifai, *E. cambrensis* M.B. Ellis, *E. globulosa* (B. Sutton) S. Hughes, *E. pinicola* (M.B. Ellis) S. Hughes, *E. ramificata* Hol.-Jech., *E. tuberculata* S.M. Leão & Gusmão, and *E. uniseptata* (M.B. Ellis) S. Hughes (Ellis 1976, Holubová-Jechová 1986, Hughes 1978, 1979; Leão-Ferreira & Gusmão 2010, Révay 1987, Rifai 2008). *Endophragmiella resinae* can be distinguished from most of these species by its obovoid to pyriform conidia with an upper cell that is 1.5–3 times longer than the lower. *Endophragmiella globulosa,* which has some morphological similarities to *E. resinae*, differs in its subglobose to broadly obovoid conidia with a brown to dark brown upper cell and pale brown to brown basal cell. The morphological features of our specimen overlap with the type specimen as described by Kirk (1981).

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Literature cited

Castañeda RF. 1988. Fungi Cubenses III. Instituto de Investigaciones Fundamentales en Agricultura Tropical "Alejandro de Humboldt" ACC, La Habana.27pp.

Ellis MB. 1976. Dematiaceous hyphomycetes. Commonwealth Mycological Institute, Kew, Surrey, England. 507pp.

Holubová-Jechová V. 1986. Lignicolous hyphomycetes from Czechoslovakia. 8. *Endophragmiella* and *Phragmocephala*. Folia Geobotanica et Phytotaxonomica 21: 173–198.

Hughes SJ. 1978. *Endophragmiella globulosa*. Fungi Canadenses 127: 1–2.

Hughes SJ. 1979. Relocation of species of *Endophragmia* auct. with notes on relevant generic names. New Zealand J. Bot. 17: 139–188.

Kirk PM. 1981. New or interesting microfungi I. Dematiaceous hyphomycetes from Devon. Trans. Br. Mycol. Soc. 76: 71–87. http://dx.doi.org/10.1016/S0007-1536(81)80010-1

Kirk PM. 1982. New or interesting microfungi V. Microfungi colonizing *Laurus nobilis* leaf litter. Trans. Br. Mycol. Soc. 78: 293–303. http://dx.doi.org/10.1016/S0007-1536(82)80013-2

Kirk PM. 1985. New or interesting microfungi XIV. Dematiaceous hyphomycetes from Mt. Kenya. Mycotaxon 23: 305–352.

Leão-Ferreira SM, Gusmão LFP. 2010. Conidial fungi from the semi-arid Caatinga biome of Brazil. New species of *Endophragmiella*, *Spegazzina* and new records for Brazil, South America and Neotropica. Mycotaxon 111: 1–10. http://dx.doi.org/10.5248/111.1

Révay Á. 1987. New or interesting hyphomycetes on forest litter from Hungary. Acta Botanica Hungarica 33: 67–73.

Rifai MA. 2008. *Endophragmiella bogoriensis* Rifai, spec. nov. (hyphomycetes). Reinwardtia 12: 275–276.

Sutton BC. 1973. Hyphomycetes from Manitoba and Saskatchewan, Canada. Mycol. Pap. 132: 1–143.

Sutton BC, Hodges Jr CS. 1978. Eucalyptus microfungi. *Chaetendophragmiopsis* gen. nov. and other hyphomycetes. Nova Hedwigia 29: 593–607.

Wu WP, Zhuang WY. 2005. *Sporidesmium*, *Endophragmiella* and related genera from China. Fungal Divers. Res. Ser. 15: 1–351.